RUTGERS
New Jersey Agricultural
Experiment Station

Draft

Impervious Cover Reduction Action Plan
for
West New York, Hudson County, New Jersey

Prepared for the Town of West New York by the
Rutgers Cooperative Extension Water Resources Program

March 29, 2017

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Introduction

Located in Hudson County in northern New Jersey, the Town of West New York covers approximately 0.99 square miles. Figures 1 and 2 illustrate that West New York is dominated by urban land uses. A total of 93.4% of the municipality's land use is classified as urban. Of the urban land in West New York, high density residential is the dominant land use (Figure 3).

The New Jersey Department of Environmental Protection's (NJDEP) 2012 land use/land cover geographical information system (GIS) data layer categorizes West New York into many unique land use areas, assigning a percent impervious cover for each delineated area. These impervious cover values were used to estimate the impervious coverage for West New York. Based upon the 2012 NJDEP land use/land cover data, approximately 69.0% of West New York has impervious cover. This level of impervious cover suggests that the streams in West New York are likely non-supporting streams. [1]

Methodology

West New York contains portions of two subwatersheds (Figure 4). For this impervious cover reduction action plan, projects have been identified in each of these watersheds. Initially, aerial imagery was used to identify potential project sites that contain extensive impervious cover. Field visits were then conducted at each of these potential project sites to determine if a viable option exists to reduce impervious cover or to disconnect impervious surfaces from draining directly to the local waterway or storm sewer system. During the site visit, appropriate green infrastructure practices for the site were determined. Sites that already had stormwater management practices in place were not considered.

[1] Caraco, D., R. Claytor, P. Hinkle, H. Kwon, T. Schueler, C. Swann, S. Vysotsky, and J. Zielinski. 1998. Rapid Watershed Planning Handbook. A Comprehensive Guide for Managing Urbanizing Watersheds. Prepared by Center For Watershed Protection, Ellicott City, MD. Prepared for U.S. Environmental Protection Agency, Office of Wetlands, Oceans and Watersheds and Region V. October 1998

Land Use Types for West New York

Figure 1: Map illustrating the land use in West New York

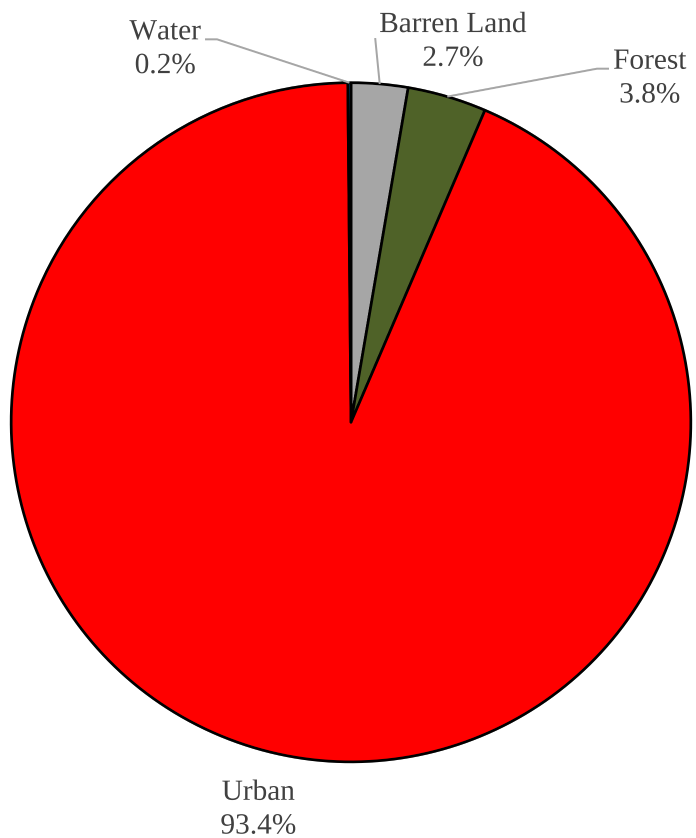


Figure 2: Pie chart illustrating the land use in West New York

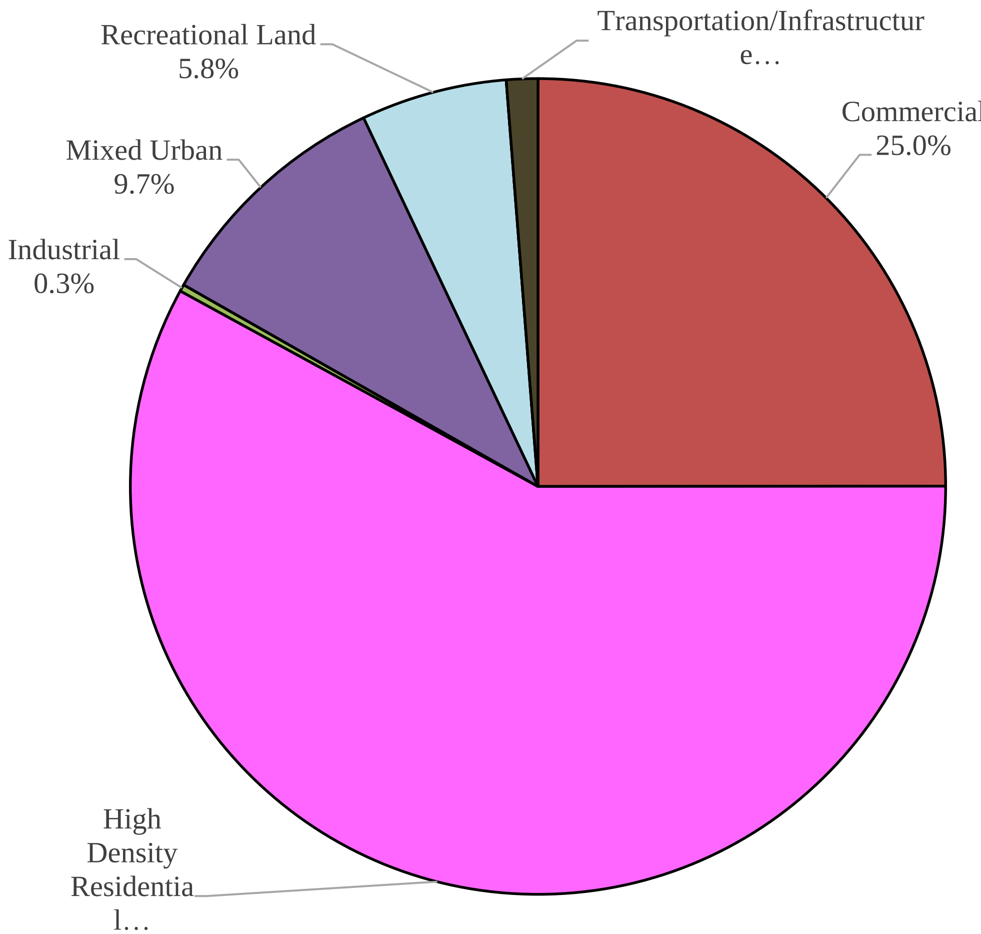


Figure 3: Pie chart illustrating the various types of urban land use in West New York

Figure 4: Map of the subwatersheds in West New York

For each potential project site, specific aerial loading coefficients for commercial land use were used to determine the annual runoff loads for total phosphorus (TP), total nitrogen (TN), and total suspended solids (TSS) from impervious surfaces (Table 1). These are the same aerial loading coefficients that NJDEP uses in developing total maximum daily loads (TMDLs) for impaired waterways of the state. The percentage of impervious cover for each site was extracted from the 2012 NJDEP land use/land cover database. For impervious areas, runoff volumes were determined for the water quality design storm (1.25 inches of rain over two-hours) and for the annual rainfall total of 44 inches.

Preliminary soil assessments were conducted for each potential project site identified in West New York using the United States Department of Agriculture Natural Resources Conservation Service Web Soil Survey, which utilizes regional and statewide soil data to predict soil types in an area. Several key soil parameters were examined (e.g., natural drainage class, saturated hydraulic conductivity of the most limiting soil layer (K_{sat}), depth to water table, and hydrologic soil group) to evaluate the suitability of each site's soil for green infrastructure practices. In cases where multiple soil types were encountered, the key soil parameters were examined for each soil type expected at a site.

For each potential project site, drainage areas were determined for each of the green infrastructure practices proposed at the site. These green infrastructure practices were designed to manage the 2-year design storm, enabling these practices to capture 95% of the annual rainfall. Runoff volumes were calculated for each proposed green infrastructure practice. The reduction in TSS loading was calculated for each drainage area for each proposed green infrastructure practice using the aerial loading coefficients in Table 1. The maximum volume reduction in stormwater runoff for each green infrastructure practice for a storm was determined by calculating the volume of runoff captured from the 2-year design storm. For each green infrastructure practice, peak discharge reduction potential was determined through hydrologic modeling in HydroCAD. For each green infrastructure practice, a cost estimate is provided. These costs are based upon the square footage of the green infrastructure practice and the real cost of green infrastructure practice implementation in New Jersey.

Table 1: Aerial Loading Coefficients[2]

Land Cover	TP load (lbs/acre/yr)	TN load (lbs/acre/yr)	TSS load (lbs/acre/yr)
High, Medium Density Residential	1.4	15	140
Low Density, Rural Residential	0.6	5	100
Commercial	2.1	22	200
Industrial	1.5	16	200
Urban, Mixed Urban, Other Urban	1.0	10	120
Agriculture	1.3	10	300
Forest, Water, Wetlands	0.1	3	40
Barrenland/Transitional Area	0.5	5	60

[2] New Jersey Department of Environmental Protection (NJDEP), Stormwater Best Management Practice Manual, 2004.

Green Infrastructure Practices

Green infrastructure is an approach to stormwater management that is cost-effective, sustainable, and environmentally friendly. Green infrastructure projects capture, filter, absorb, and reuse stormwater to maintain or mimic natural systems and to treat runoff as a resource. As a general principal, green infrastructure practices use soil and vegetation to recycle stormwater runoff through infiltration and evapotranspiration. When used as components of a stormwater management system, green infrastructure practices such as bioretention, green roofs, porous pavement, rain gardens, and vegetated swales can produce a variety of environmental benefits. In addition to effectively retaining and infiltrating rainfall, these practices can simultaneously help filter air pollutants, reduce energy demands, mitigate urban heat islands, and sequester carbon while also providing communities with aesthetic and natural resource benefits[3]. A wide range of green infrastructure practices have been evaluated for the potential project sites in West New York. Each practice is discussed below.

Disconnected downspouts

This is often referred to as simple disconnection. A downspout is simply disconnected, prevented from draining directly to the roadway or storm sewer system, and directed to discharge water to a pervious area (i.e., lawn).

Pervious pavements

There are several types of permeable pavement systems including porous asphalt, pervious concrete, permeable pavers, and grass pavers. These surfaces are hard and support vehicle traffic but also allow water to infiltrate through the surface. They have an underlying stone layer to store stormwater runoff and allow it to slowly seep into the ground.

[3] United States Environmental Protection Agency (USEPA), 2013. Watershed Assessment, Tracking, and Environmental Results, New Jersey Water Quality Assessment Report. http://ofmpub.epa.gov/waters10/attains_state.control?p_state=NJ

Bioretention systems/rain gardens

These are landscaped features that are designed to capture, treat, and infiltrate stormwater runoff. These systems can easily be incorporated into existing landscapes, improving aesthetics and creating wildlife habitat while managing stormwater runoff. Bioretention systems also can be used in soils that do not quickly infiltrate by incorporating an underdrain into the system.

Downspout planter boxes

These are wooden boxes with plants installed at the base of a downspout that provide an opportunity to beneficially reuse rooftop runoff.

Rainwater harvesting systems (cistern or rain barrel)

These systems capture rainwater, mainly from rooftops, in cisterns or rain barrels. The water can then be used for watering gardens, washing vehicles, or for other non-potable uses.




Bioswale

Bioswales are landscape features that convey stormwater from one location to another while removing pollutants and providing water an opportunity to infiltrate.

Stormwater planters

Stormwater planters are vegetated structures that are built into the sidewalk to intercept stormwater runoff from the roadway or sidewalk. Many of these planters are designed to allow the water to infiltrate into the ground while others are designed simply to filter the water and convey it back into the stormwater sewer system.

Tree filter boxes

These are pre-manufactured concrete boxes that contain a special soil mix and are planted with a tree or shrub. They filter stormwater runoff but provide little storage capacity. They are typically designed to quickly filter stormwater and then discharge it to the local sewer system.

Potential Project Sites

Attachment 1 contains information on potential project sites where green infrastructure practices could be installed. The recommended green infrastructure practices and the drainage area that the green infrastructure practice can treat are identified for each potential project site. For each practice, the recharge potential, TSS removal potential, maximum volume reduction potential per storm, and the peak reduction potential are provided. This information is also provided so that proposed development projects that cannot satisfy the New Jersey stormwater management requirements for major development can use one of the identified projects to offset a stormwater management deficit. [4]

[4] New Jersey Administrative Code, N.J.A.C. 7:8, Stormwater Management, Statutory Authority: N.J.S.A. 12:5-3, 13:1D-1 et seq., 13:9A-1 et seq., 13:19-1 et seq., 40:55D-93 to 99, 58:4-1 et seq., 58:10A-1 et seq., 58:11A-1 et seq. and 58:16A-50 et seq., *Date last amended: April 19, 2010*.

Conclusion

This impervious cover reduction action plan is meant to provide the municipality with a blueprint for implementing green infrastructure practices that will reduce the impact of stormwater runoff from impervious surfaces. These projects can be implemented by a wide variety of people such as boy scouts, girl scouts, school groups, faith-based groups, social groups, watershed groups, and other community groups.

Additionally, development projects that are in need of providing off-site compensation for stormwater impacts can use the projects in this plan as a starting point. The municipality can quickly convert this impervious cover reduction action plan into a stormwater mitigation plan and incorporate it into the municipal stormwater control ordinance.

a. Green Infrastructure Sites

WEST NEW YORK: GREEN INFRASTRUCTURE SITES

SITES WITHIN THE HACKENSACK RIVER SUBWATERSHED:

1. Robert Menendez Elementary School
2. West New York Parking Authority: 51st Street Parking Lot

SITES WITHIN THE HUDSON RIVER SUBWATERSHED:

3. Church of Saint Joseph of the Palisades
4. Harry L. Bain Elementary School
5. Memorial High School
6. West New York Board of Education
7. West New York Parking Authority: 54th Street Parking Lot
8. West New York Parking Authority: 58th Street Parking Lot
9. West New York Parking Authority: 59th Street Parking Lot
10. West New York Parking Authority: 62nd Street Parking Lot
11. West New York Parking Authority: 63rd Street Parking Lot
12. West New York Parking Authority: 66th Street Parking Lot
13. West New York Parking Authority: 67th Street Parking Lot

b. Green Infrastructure Concepts

ROBERT MENENDEZ ELEMENTARY SCHOOL

Subwatershed: Hackensack River

Site Area: 82,208 sq. ft.

Address: 600 55th Street
West New York, NJ 07093

Block and Lot: Block 121, Lot 4.01

Parking spaces can be replaced with pervious pavement to capture and infiltrate stormwater. Stormwater planters can be installed to capture, treat, and infiltrate runoff. A preliminary soil assessment suggests that more soil testing would be required before determining the soil's suitability for green infrastructure.

Impervious Cover		Existing Loads from Impervious Cover (lbs/yr)			Runoff Volume from Impervious Cover (Mgal)	
%	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44"
95	78,089	3.8	39.4	358.5	0.061	2.14

Recommended Green Infrastructure Practices	Recharge Potential (Mgal/yr)	TSS Removal Potential (lbs/yr)	Maximum Volume Reduction Potential (gal/storm)	Peak Discharge Reduction Potential (cu. ft./second)	Estimated Size (sq. ft.)	Estimated Cost
Pervious pavement	0.279	47	20,459	0.77	1,900	$47,500
Stormwater planters	0.146	24	10,705	0.40	500	$187,500

GREEN INFRASTRUCTURE RECOMMENDATIONS

Robert Menendez Elementary School

- pervious pavement
- stormwater planter
- drainage area
- property line
- 2015 Aerial: NJOIT, OGIS

0 50' 100'

WEST NEW YORK PARKING AUTHORITY: 51ST STREET PARKING LOT

Subwatershed: Hackensack River

Site Area: 64,485 sq. ft.

Address: 501 52nd Street
West New York, NJ 07093

Block and Lot: Block 108, Lot 8

Parking spaces can be replaced with pervious pavement to capture and infiltrate stormwater. A preliminary soil assessment suggests that more soil testing would be required before determining the soil's suitability for green infrastructure.

Impervious Cover		Existing Loads from Impervious Cover (lbs/yr)			Runoff Volume from Impervious Cover (Mgal)	
%	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44"
95	61,261	3.0	30.9	281.3	0.048	1.68

Recommended Green Infrastructure Practices	Recharge Potential (Mgal/yr)	TSS Removal Potential (lbs/yr)	Maximum Volume Reduction Potential (gal/storm)	Peak Discharge Reduction Potential (cu. ft./second)	Estimated Size (sq. ft.)	Estimated Cost
Pervious pavement	0.860	144	63,098	2.37	9,000	$225,000

GREEN INFRASTRUCTURE RECOMMENDATIONS

West New York Parking Authority: 51st Street Parking Lot

pervious pavement

drainage area

property line

2015 Aerial: NJOIT, OGIS

0 50' 100'

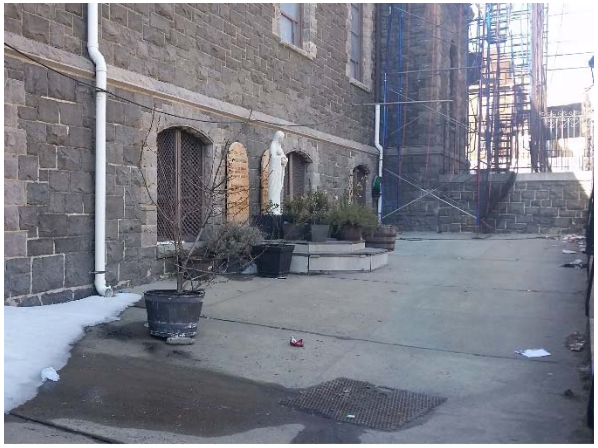
CHURCH OF SAINT JOSEPH OF THE PALISADES

Subwatershed: Hudson River

Site Area: 46,526 sq. ft.

Address: 6401 Palisade Avenue
West New York, NJ 07093

Block and Lot: Block 31, Lot 26

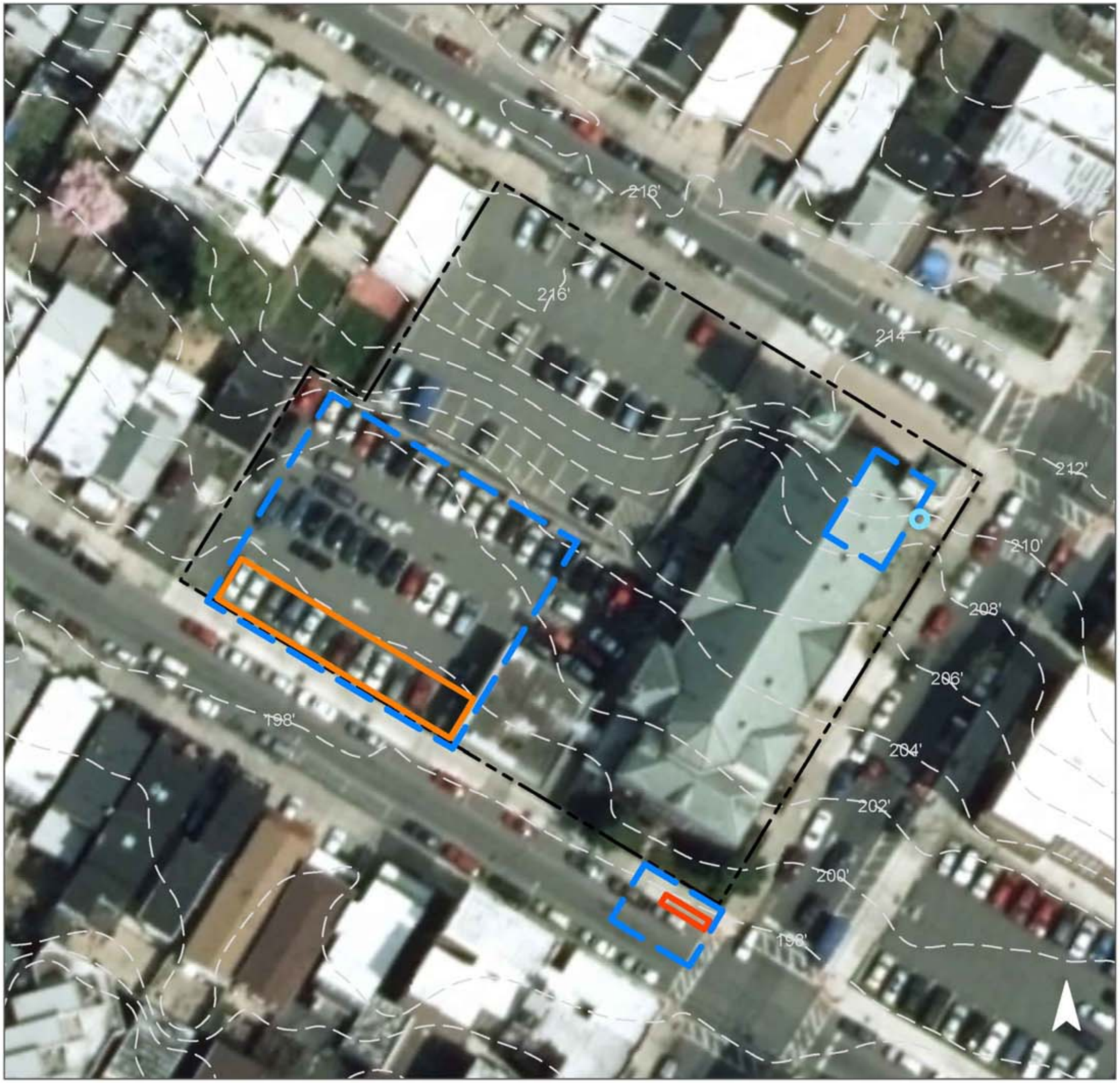


Parking spaces can be replaced with pervious pavement to capture and infiltrate stormwater. Stormwater planters can be installed to capture, treat, and infiltrate runoff. A cistern can also be installed to capture and reuse roof runoff. A preliminary soil assessment suggests that more soil testing would be required before determining the soil's suitability for green infrastructure.

Impervious Cover		Existing Loads from Impervious Cover (lbs/yr)			Runoff Volume from Impervious Cover (Mgal)	
%	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44"
95	44,138	2.1	22.3	202.7	0.034	1.21

Recommended Green Infrastructure Practices	Recharge Potential (Mgal/yr)	TSS Removal Potential (lbs/yr)	Maximum Volume Reduction Potential (gal/storm)	Peak Discharge Reduction Potential (cu. ft./second)	Estimated Size (sq. ft.)	Estimated Cost
Pervious pavement	0.279	47	20,459	0.77	1,900	$47,500
Rainwater harvesting system	0.026	4	800	0.07	800 (gal)	$1,600
Stormwater planter	0.023	4	1,721	0.06	80	$30,000

GREEN INFRASTRUCTURE RECOMMENDATIONS



Church of Saint Joseph of the Palisades

- pervious pavement
- rainwater harvesting
- stormwater planter
- drainage area
- property line
- 2015 Aerial: NJOIT, OGIS

0 30' 60'

HARRY L. BAIN ELEMENTARY SCHOOL

Subwatershed: Hudson River

Site Area: 53,408 sq. ft.

Address: 160 54th Street
West New York, NJ 07093

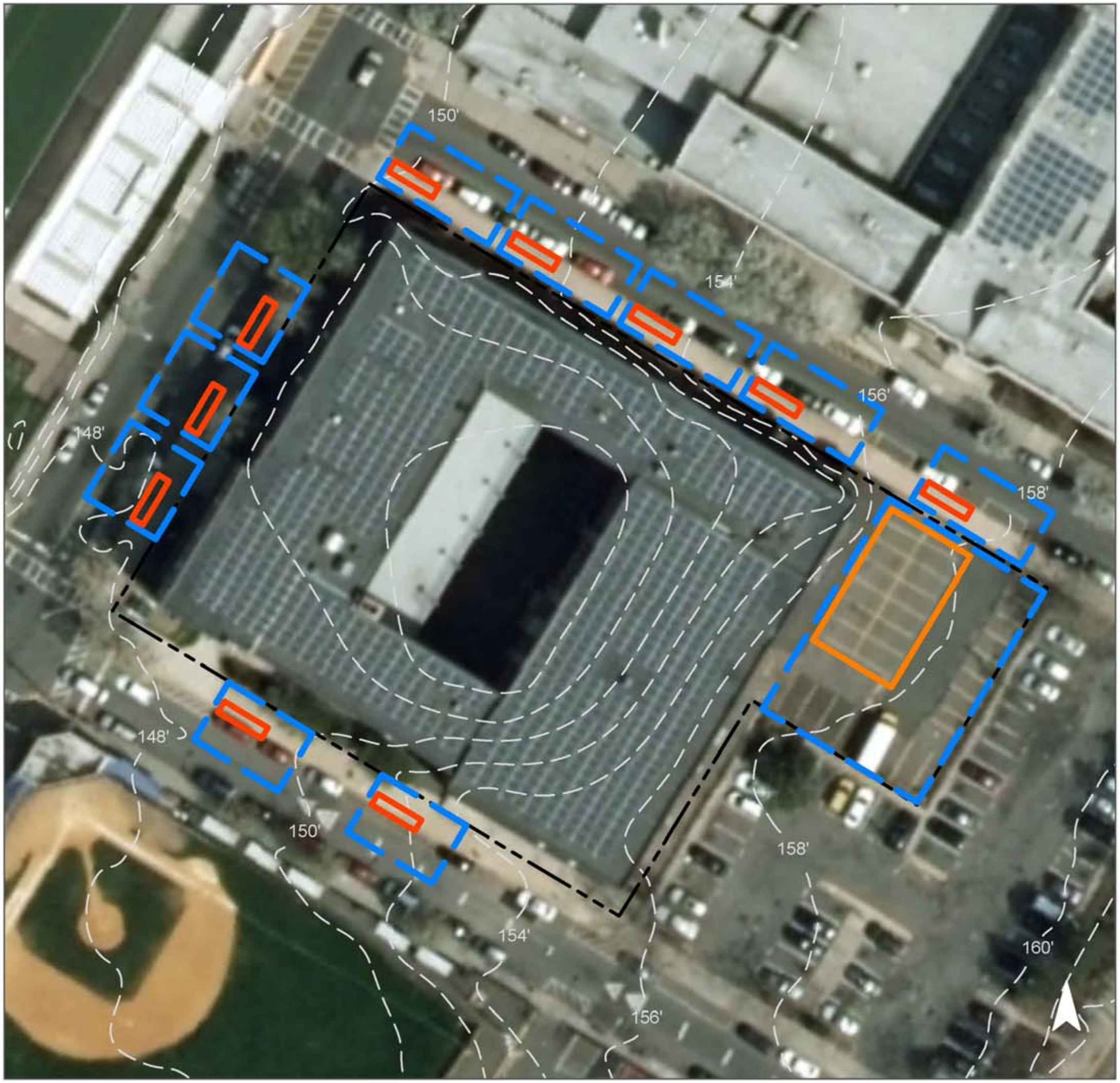
Block and Lot: Block 77, Lot 1

Parking spaces can be replaced with pervious pavement to capture and infiltrate stormwater. Stormwater planters can be installed to capture, treat, and infiltrate runoff. A preliminary soil assessment suggests that more soil testing would be required before determining the soil's suitability for green infrastructure.

Impervious Cover		Existing Loads from Impervious Cover (lbs/yr)			Runoff Volume from Impervious Cover (Mgal)	
%	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44"
85	45,397	2.2	22.9	208.4	0.035	1.25

Recommended Green Infrastructure Practices	Recharge Potential (Mgal/yr)	TSS Removal Potential (lbs/yr)	Maximum Volume Reduction Potential (gal/storm)	Peak Discharge Reduction Potential (cu. ft./second)	Estimated Size (sq. ft.)	Estimated Cost
Pervious pavement	0.180	30	13,196	0.50	2,100	$52,500
Stormwater planters	0.300	50	21,948	0.83	1,000	$375,000

GREEN INFRASTRUCTURE RECOMMENDATIONS



Harry L. Bain Elementary School

- pervious pavement
- stormwater planter
- drainage area
- property line
- 2015 Aerial: NJOIT, OGIS

0 30' 60'

MEMORIAL HIGH SCHOOL

Subwatershed: Hudson River

Site Area: 90,052 sq. ft.

Address: 5501 Park Avenue
West New York, NJ 07093

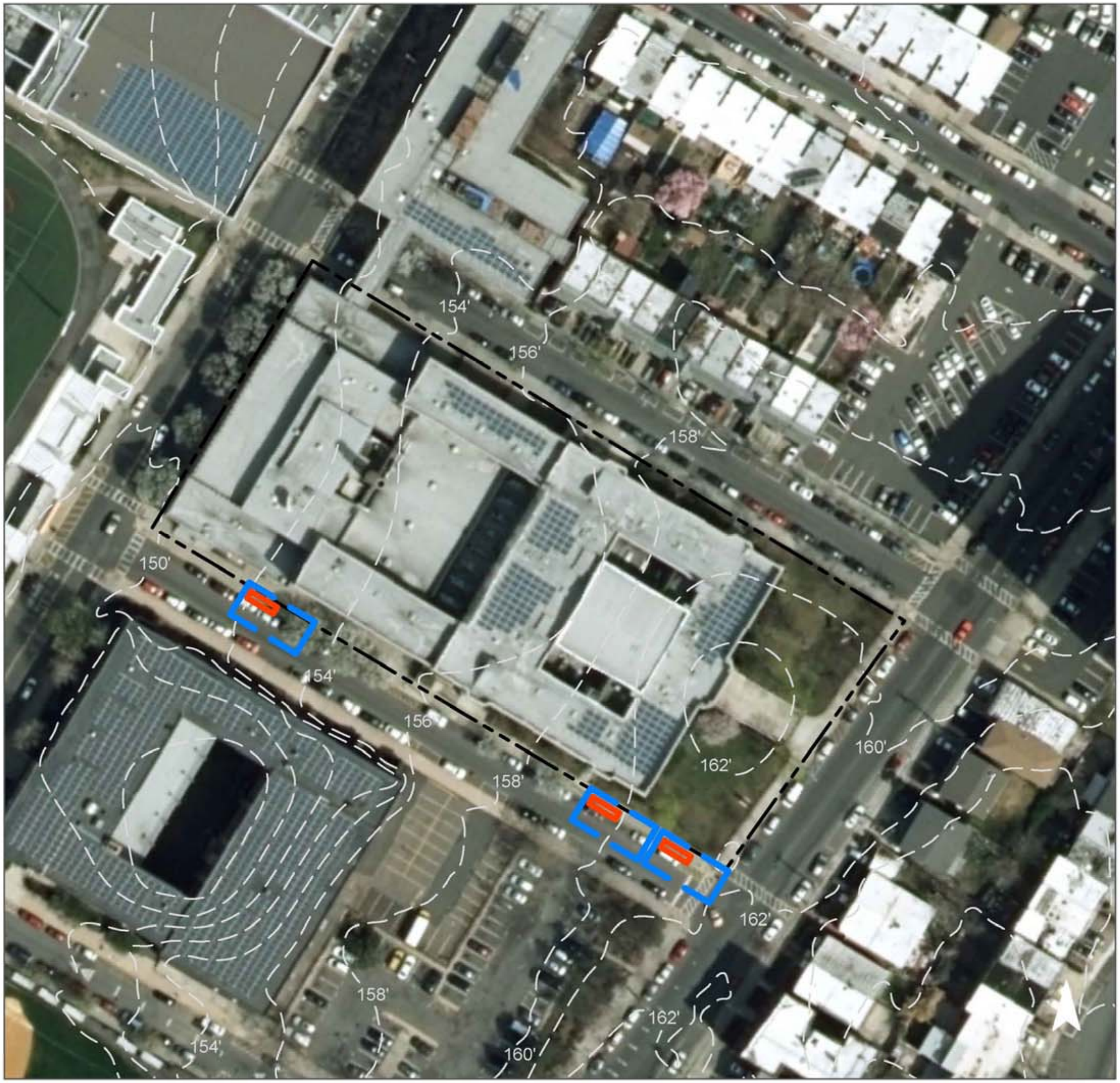
Block and Lot: Block 75, Lot 1

Stormwater planters can be installed to capture, treat, and infiltrate runoff. A preliminary soil assessment suggests that more soil testing would be required before determining the soil's suitability for green infrastructure.

Impervious Cover		Existing Loads from Impervious Cover (lbs/yr)			Runoff Volume from Impervious Cover (Mgal)	
%	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44"
85	76,545	3.7	38.7	351.4	0.060	2.10

Recommended Green Infrastructure Practices	Recharge Potential (Mgal/yr)	TSS Removal Potential (lbs/yr)	Maximum Volume Reduction Potential (gal/storm)	Peak Discharge Reduction Potential (cu. ft./second)	Estimated Size (sq. ft.)	Estimated Cost
Stormwater planters	0.096	16	7,076	0.27	300	$112,500

GREEN INFRASTRUCTURE RECOMMENDATIONS



Memorial High School

- stormwater planter
- drainage area
- property line
- 2015 Aerial: NJOIT, OGIS

0 50' 100'

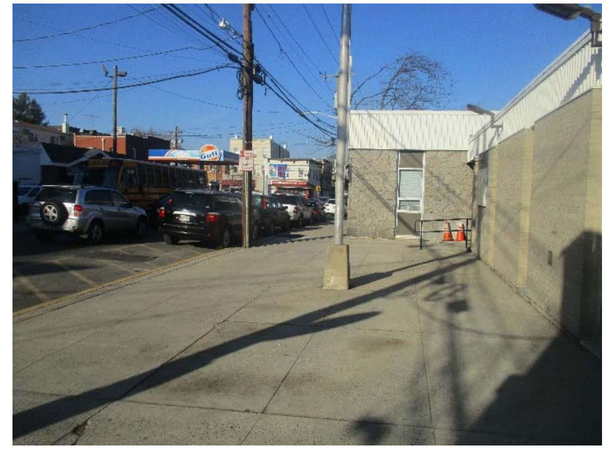
WEST NEW YORK BOARD OF EDUCATION

Subwatershed: Hudson River

Site Area: 21,037 sq. ft.

Address: 6028 Broadway
West New York, NJ 07093

Block and Lot: Block 45, Lot 8.01



A paved area in front of the Board of Education can be depaved and converted into a bioswale to treat runoff. Stormwater planters can also be installed to capture, treat, and infiltrate road runoff. Parking spaces can be replaced with pervious pavement to capture and infiltrate stormwater. A preliminary soil assessment suggests that more soil testing would be required before determining the soil's suitability for green infrastructure.

Impervious Cover		Existing Loads from Impervious Cover (lbs/yr)			Runoff Volume from Impervious Cover (Mgal)	
%	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44"
61	12,765	0.6	6.4	58.6	0.010	0.35

Recommended Green Infrastructure Practices	Recharge Potential (Mgal/yr)	TSS Removal Potential (lbs/yr)	Maximum Volume Reduction Potential (gal/storm)	Peak Discharge Reduction Potential (cu. ft./second)	Estimated Size (sq. ft.)	Estimated Cost
Bioswale	0.175	29	12,807	0.48	2,350	$58,750
Pervious pavement	0.010	2	763	0.03	400	$2,000
Stormwater planters	0.130	22	9,560	0.36	450	$168,750

GREEN INFRASTRUCTURE RECOMMENDATIONS

West New York Board of Education

- bioswale
- pervious pavement
- stormwater planter
- drainage area
- property line
- 2015 Aerial: NJOIT, OGIS

0 30' 60'

WEST NEW YORK PARKING AUTHORITY: 54TH STREET PARKING LOT

Subwatershed: Hudson River

Site Area: 30,243 sq. ft.

Address: 5401 Park Avenue
West New York, NJ 07093

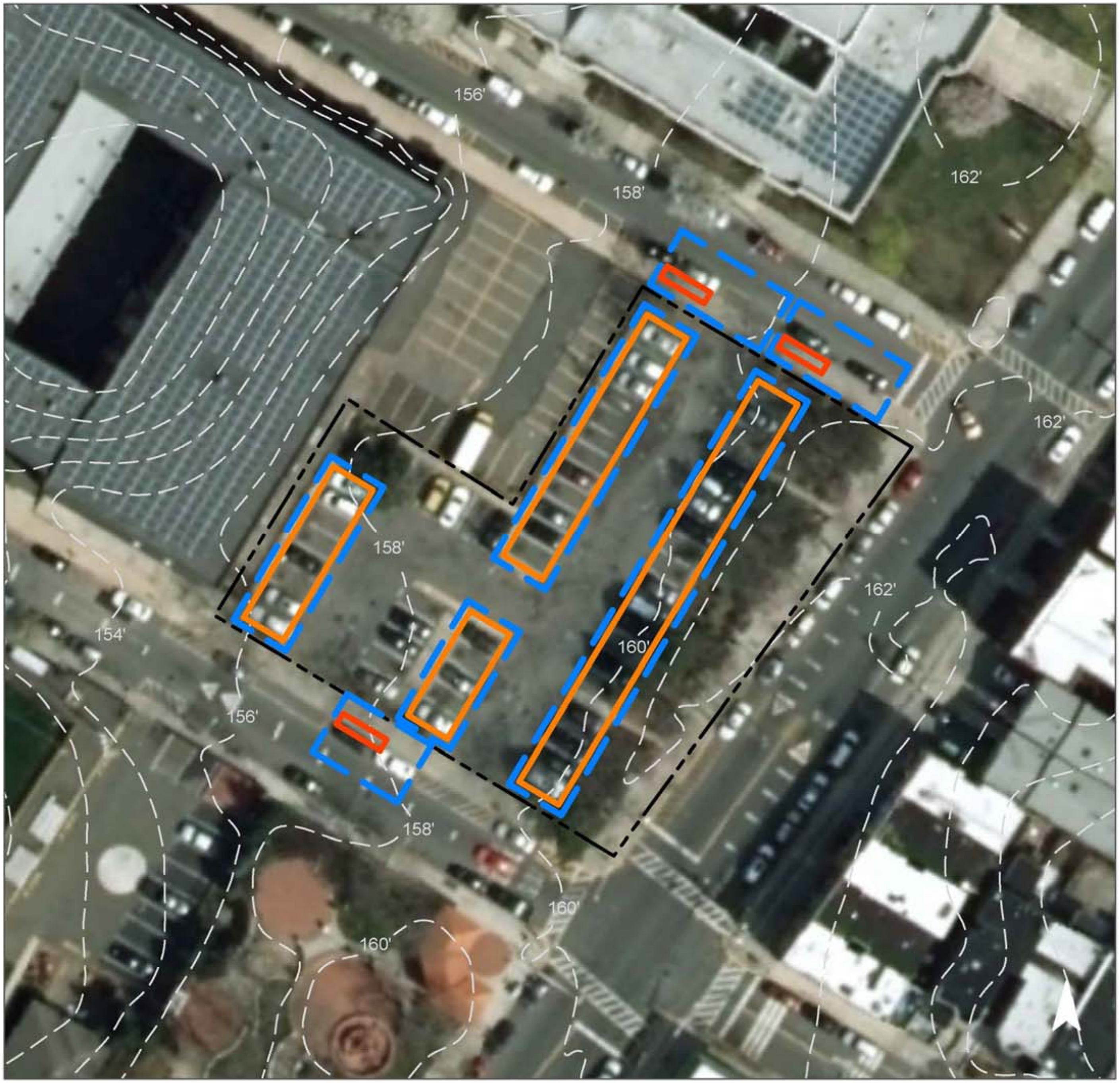
Block and Lot: Block 77, Lot 2

Parking spaces can be replaced with pervious pavement to capture and infiltrate stormwater. Stormwater planters can be installed to capture, treat, and infiltrate runoff. A preliminary soil assessment suggests that more soil testing would be required before determining the soil's suitability for green infrastructure.

Impervious Cover		Existing Loads from Impervious Cover (lbs/yr)			Runoff Volume from Impervious Cover (Mgal)	
%	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44"
85	25,706	1.2	13.0	118.0	0.020	0.71

Recommended Green Infrastructure Practices	Recharge Potential (Mgal/yr)	TSS Removal Potential (lbs/yr)	Maximum Volume Reduction Potential (gal/storm)	Peak Discharge Reduction Potential (cu. ft./second)	Estimated Size (sq. ft.)	Estimated Cost
Pervious pavement	0.240	40	17,587	0.66	7,400	$185,000
Stormwater planters	0.091	15	6,695	0.25	300	$112,500

GREEN INFRASTRUCTURE RECOMMENDATIONS



West New York Parking Authority: 54th Street Parking Lot

- pervious pavement
- stormwater planter
- drainage area
- property line
- 2015 Aerial: NJOIT, OGIS

0 30' 60'

WEST NEW YORK PARKING AUTHORITY: 58TH STREET PARKING LOT

Subwatershed: Hudson River

Site Area: 30,047 sq. ft.

Address: 429 58th Street
West New York, NJ 07093

Block and Lot: Block 71, Lot 6

Parking spaces can be replaced with pervious pavement to capture and infiltrate stormwater. A preliminary soil assessment suggests that more soil testing would be required before determining the soil's suitability for green infrastructure.

Impervious Cover		Existing Loads from Impervious Cover (lbs/yr)			Runoff Volume from Impervious Cover (Mgal)	
%	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44"
94	28,099	1.4	14.2	129.0	0.022	0.77

Recommended Green Infrastructure Practices	Recharge Potential (Mgal/yr)	TSS Removal Potential (lbs/yr)	Maximum Volume Reduction Potential (gal/storm)	Peak Discharge Reduction Potential (cu. ft./second)	Estimated Size (sq. ft.)	Estimated Cost
Pervious pavement	0.625	105	45,886	1.72	4,200	$105,000

GREEN INFRASTRUCTURE RECOMMENDATIONS

West New York Parking Authority: 58th Street Parking Lot

- pervious pavement
- drainage area
- property line
- 2015 Aerial: NJOIT, OGIS

0 30' 60'

WEST NEW YORK PARKING AUTHORITY: 59TH STREET PARKING LOT

Subwatershed: Hudson River

Site Area: 57,432 sq. ft.

Address: 5700 Madison Street
West New York, NJ 07093

Block and Lot: Block 125, Lot 1

Parking spaces can be replaced with pervious pavement to capture and infiltrate stormwater. Stormwater planters can be installed to capture, treat, and infiltrate runoff. A preliminary soil assessment suggests that more soil testing would be required before determining the soil's suitability for green infrastructure.

Impervious Cover		Existing Loads from Impervious Cover (lbs/yr)			Runoff Volume from Impervious Cover (Mgal)	
%	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44"
93	53,250	2.6	26.9	244.5	0.041	1.46

Recommended Green Infrastructure Practices	Recharge Potential (Mgal/yr)	TSS Removal Potential (lbs/yr)	Maximum Volume Reduction Potential (gal/storm)	Peak Discharge Reduction Potential (cu. ft./second)	Estimated Size (sq. ft.)	Estimated Cost
Pervious pavement	0.724	121	53,157	2.00	11,700	$292,500

GREEN INFRASTRUCTURE RECOMMENDATIONS

West New York Parking Authority: 59th Street Parking Lot

- pervious pavement
- drainage area
- property line
- 2015 Aerial: NJOIT, OGIS

0 50' 100'

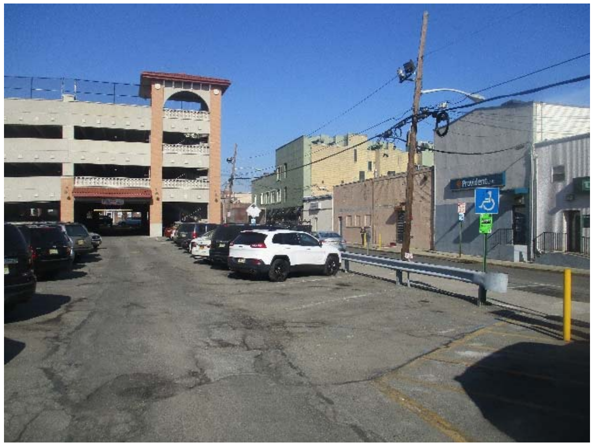
WEST NEW YORK PARKING AUTHORITY: 62ND STREET PARKING LOT

Subwatershed: Hudson River

Site Area: 56,715 sq. ft.

Address: 6103 Van Buren Place
West New York, NJ 07093

Block and Lot: Block 140, Lot 16



Parking spaces can be replaced with pervious pavement to capture and infiltrate stormwater. A preliminary soil assessment suggests that more soil testing would be required before determining the soil's suitability for green infrastructure.

Impervious Cover		Existing Loads from Impervious Cover (lbs/yr)			Runoff Volume from Impervious Cover (Mgal)	
%	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44"
95	53,879	2.6	27.2	247.4	0.042	1.48

Recommended Green Infrastructure Practices	Recharge Potential (Mgal/yr)	TSS Removal Potential (lbs/yr)	Maximum Volume Reduction Potential (gal/storm)	Peak Discharge Reduction Potential (cu. ft./second)	Estimated Size (sq. ft.)	Estimated Cost
Pervious pavement	0.730	122	53,538	2.01	4,200	$105,000

GREEN INFRASTRUCTURE RECOMMENDATIONS

West New York Parking Authority: 62nd Street Parking Lot

- pervious pavement
- drainage area
- property line
- 2015 Aerial: NJOIT, OGIS

0 50' 100'

WEST NEW YORK PARKING AUTHORITY: 63RD STREET PARKING LOT

Subwatershed: Hudson River

Site Area: 14,271 sq. ft.

Address: 6305 Bergenline Avenue
West New York, NJ 07093

Block and Lot: Block 151, Lot 8

Parking spaces can be replaced with pervious pavement to capture and infiltrate stormwater. A preliminary soil assessment suggests that more soil testing would be required before determining the soil's suitability for green infrastructure.

Impervious Cover		Existing Loads from Impervious Cover (lbs/yr)			Runoff Volume from Impervious Cover (Mgal)	
%	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44"
94	13,483	0.7	6.8	61.9	0.011	0.37

Recommended Green Infrastructure Practices	Recharge Potential (Mgal/yr)	TSS Removal Potential (lbs/yr)	Maximum Volume Reduction Potential (gal/storm)	Peak Discharge Reduction Potential (cu. ft./second)	Estimated Size (sq. ft.)	Estimated Cost
Pervious pavement	0.177	30	13,001	0.49	4,900	$122,500

GREEN INFRASTRUCTURE RECOMMENDATIONS

West New York Parking Authority: 63rd Street Parking Lot

- pervious pavement
- drainage area
- property line
- 2015 Aerial: NJOIT, OGIS

0 30' 60'

WEST NEW YORK PARKING AUTHORITY: 66TH STREET PARKING LOT

Subwatershed: Hudson River

Site Area: 29,564 sq. ft.

Address: 6600 Park Avenue
West New York, NJ 07093

Block and Lot: Block 4, Lot 1

Parking spaces can be replaced with pervious pavement to capture and infiltrate stormwater. Stormwater planters can be installed to capture, treat, and infiltrate runoff. A preliminary soil assessment suggests that more soil testing would be required before determining the soil's suitability for green infrastructure.

Impervious Cover		Existing Loads from Impervious Cover (lbs/yr)			Runoff Volume from Impervious Cover (Mgal)	
%	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44"
88	25,872	1.2	13.1	118.8	0.020	0.71

Recommended Green Infrastructure Practices	Recharge Potential (Mgal/yr)	TSS Removal Potential (lbs/yr)	Maximum Volume Reduction Potential (gal/storm)	Peak Discharge Reduction Potential (cu. ft./second)	Estimated Size (sq. ft.)	Estimated Cost
Pervious pavement	0.294	49	21,604	0.81	2,600	$65,000
Stormwater planter	0.370	62	27,147	1.02	1,400	$525,000

GREEN INFRASTRUCTURE RECOMMENDATIONS

West New York Parking Authority: 66th Street Parking Lot

- pervious pavement
- stormwater planter
- drainage area
- property line
- 2015 Aerial: NJOIT, OGIS

0 25' 50'

WEST NEW YORK PARKING AUTHORITY: 67TH STREET PARKING LOT

Subwatershed: Hudson River

Site Area: 10,037 sq. ft.

Address: 439 67th Street
West New York, NJ 07093

Block and Lot: Block 16, Lot 9

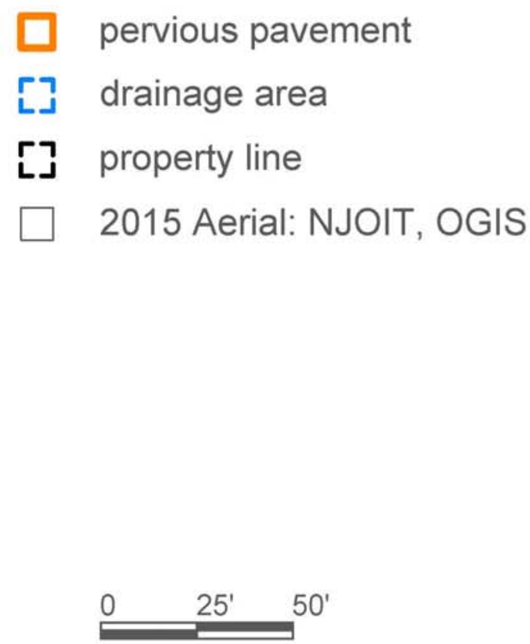
Parking spaces can be replaced with pervious pavement to capture and infiltrate stormwater. A preliminary soil assessment suggests that more soil testing would be required before determining the soil's suitability for green infrastructure.

Impervious Cover		Existing Loads from Impervious Cover (lbs/yr)			Runoff Volume from Impervious Cover (Mgal)	
%	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44"
92	9,228	0.4	4.7	42.4	0.007	0.25

Recommended Green Infrastructure Practices	Recharge Potential (Mgal/yr)	TSS Removal Potential (lbs/yr)	Maximum Volume Reduction Potential (gal/storm)	Peak Discharge Reduction Potential (cu. ft./second)	Estimated Size (sq. ft.)	Estimated Cost
Pervious pavement	0.211	35	15,485	0.58	1,300	$32,500

GREEN INFRASTRUCTURE RECOMMENDATIONS

West New York Parking Authority: 67th Street Parking Lot



c. Summary of Existing Conditions

Summary of Existing Site Conditions

	Subwatershed/Site Name/Total Site Info/GI Practice	Area (ac)	Area (SF)	Block	Lot	Existing Annual Loads TP (lb/yr)	TN (lb/yr)	TSS (lb/yr)	I.C. %	I.C. Area (ac)	I.C. Area (SF)	Runoff Volumes from I.C. Water Quality Storm (1.25" over 2-hours) (Mgal)	Annual (Mgal)
	HACKENSACK RIVER SUBWATERSHED	**3.37**	**146,693**			**6.7**	**70.4**	**639.8**	**190**	**3.20**	**139,349**	**0.109**	**3.82**
1	**Robert Menendez Elementary School**												
	Total Site Info	1.89	82,208	121	4.01	3.8	39.4	358.5	95	1.79	78,089	0.061	2.14
2	**West New York Parking Authority: 51st Street Parking Lot**												
	Total Site Info	1.48	64,485	108	8	3.0	30.9	281.3	95	1.41	61,261	0.048	1.68
	HUDSON RIVER SUBWATERSHED	**10.09**	**439,332**			**18.7**	**196.1**	**1,783.1**	**966**	**8.92**	**388,361**	**0.303**	**10.65**
3	**Church of Saint Joseph of the Palisades**												
	Total Site Info	1.07	46,526	31	26	2.1	22.3	202.7	95	1.01	44,138	0.034	1.21
4	**Harry L. Bain Elementary School**												
	Total Site Info	1.23	53,408	77	1	2.2	22.9	208.4	85	1.04	45,397	0.035	1.25
5	**Memorial High School**												
	Total Site Info	2.07	90,052	75	1	3.7	38.7	351.4	85	1.76	76,545	0.060	2.10
6	**West New York Board of Education**												
	Total Site Info	0.48	21,037	45	8.01	0.6	6.4	58.6	61	0.29	12,765	0.010	0.35
7	**West New York Parking Authority: 54th Street Parking Lot**												
	Total Site Info	0.69	30,243	77	2	1.2	13.0	118.0	85	0.59	25,706	0.020	0.71
8	**West New York Parking Authority: 58th Street Parking Lot**												
	Total Site Info	0.69	30,047	71	6	1.4	14.2	129.0	94	0.65	28,099	0.022	0.77
9	**West New York Parking Authority: 59th Street Parking Lot**												
	Total Site Info	1.32	57,432	125	1	2.6	26.9	244.5	93	1.22	53,250	0.041	1.46
10	**West New York Parking Authority: 62nd Street Parking Lot**												
	Total Site Info	1.30	56,715	140	16	2.6	27.2	247.4	95	1.24	53,879	0.042	1.48
11	**West New York Parking Authority: 63rd Street Parking Lot**												
	Total Site Info	0.33	14,271	151	8	0.7	6.8	61.9	94	0.31	13,483	0.011	0.37

Summary of Existing Site Conditions

	Subwatershed/Site Name/Total Site Info/GI Practice	Area (ac)	Area (SF)	Block	Lot	Existing Annual Loads TP (lb/yr)	TN (lb/yr)	TSS (lb/yr)	I.C. %	I.C. Area (ac)	I.C. Area (SF)	Runoff Volumes from I.C. Water Quality Storm (1.25" over 2-hours) (Mgal)	Annual (Mgal)
12	**West New York Parking Authority: 66th Street Parking Lot**												
	Total Site Info	0.68	29,564	4	1	1.2	13.1	118.8	88	0.59	25,872	0.020	0.71
13	**West New York Parking Authority: 67th Street Parking Lot**												
	Pervious pavement												
	Total Site Info	0.23	10,037	16	9	0.4	4.7	42.4	92	0.21	9,228	0.007	0.25

d. Summary of Proposed Green Infrastructure Practices

Summary of Proposed Green Infrastructure Practices

	Subwatershed/Site Name/Total Site Info/GI Practice	Potential Management Area Area (SF)	Potential Management Area Area (ac)	Recharge Potential (Mgal/yr)	TSS Removal Potential (lbs/yr)	Max Volume Reduction Potential (gal/storm)	Peak Discharge Reduction Potential (cfs)	Size of BMP (SF)	Unit Cost ($)	Unit	Total Cost ($)	I.C. Treated %
	HACKENSACK RIVER SUBWATERSHED	**49,300**	**1.13**	**1.285**	**215**	**94,262**	**3.54**	**11,400**			**$460,000**	**35.4%**
1	**Robert Menendez Elementary School**											
	Pervious pavement	10,700	0.25	0.279	47	20,459	0.77	1,900	25	SF	$47,500	13.7%
	Stormwater planters	5,600	0.13	0.146	24	10,705	0.40	500	375	SF	$187,500	7.2%
	Total Site Info	**16,300**	**0.37**	**0.425**	**71**	**31,164**	**1.17**	**2,400**			**$235,000**	20.9%
2	**West New York Parking Authority: 51st Street Parking Lot**											
	Pervious pavement	33,000	0.76	0.860	144	63,098	2.37	9,000	25	SF	$225,000	53.9%
	Total Site Info	**33,000**	**0.76**	**0.860**	**144**	**63,098**	**2.37**	**9,000**			**$225,000**	53.9%
	HUDSON RIVER SUBWATERSHED	**179,700**	**4.13**	**4.682**	**784**	**342,463**	**12.91**	**47,380**			**$2,393,600**	**46.3%**
3	**Church of Saint Joseph of the Palisades**											
	Pervious pavement	10,700	0.25	0.279	47	20,459	0.77	1,900	25	SF	$47,500	24.2%
	Rainwater harvesting system	1,000	0.02	0.026	4	800	0.07	800	2	gal	$1,600	2.3%
	Stormwater planter	900	0.02	0.023	4	1,721	0.06	80	375	SF	$30,000	2.0%
	Total Site Info	**12,600**	**0.29**	**0.328**	**55**	**22,980**	**0.90**	**2,780**			**$79,100**	28.5%
4	**Harry L. Bain Elementary School**											
	Pervious pavement	6,900	0.16	0.180	30	13,196	0.50	2,100	25	SF	$52,500	15.2%
	Stormwater planters	11,500	0.26	0.300	50	21,984	0.83	1,000	375	SF	$375,000	25.3%
	Total Site Info	**18,400**	**0.42**	**0.479**	**80**	**35,179**	**1.33**	**3,100**			**$427,500**	40.5%
5	**Memorial High School**											
	Stormwater planters	3,700	0.08	0.096	16	7,076	0.27	300	375	SF	$112,500	4.8%
	Total Site Info	**3,700**	**0.08**	**0.096**	**16**	**7,076**	**0.27**	**300**			**$112,500**	4.8%
6	**West New York Board of Education**											
	Pervious pavement	6,700	0.15	0.175	29	12,807	0.48	2,350	25	SF	$58,750	52.5%
	Bioswale	400	0.01	0.010	2	763	0.03	400	5	SF	$2,000	3.1%
	Stormwater planters	5,000	0.11	0.130	22	9,560	0.36	450	375	SF	$168,750	39.2%
	Total Site Info	**12,100**	**0.28**	**0.315**	**53**	**23,130**	**0.87**	**3,200**			**$229,500**	94.8%

Summary of Proposed Green Infrastructure Practices

	Subwatershed/Site Name/Total Site Info/GI Practice	Potential Management Area Area (SF)	Area (ac)	Recharge Potential (Mgal/yr)	TSS Removal Potential (lbs/yr)	Max Volume Reduction Potential (gal/storm)	Peak Discharge Reduction Potential (cfs)	Size of BMP (SF)	Unit Cost ($)	Unit	Total Cost ($)	I.C. Treated %
7	**West New York Parking Authority: 54th Street Parking Lot**											
	Pervious pavement	9,200	0.21	0.240	40	17,587	0.66	7,400	25	SF	$185,000	35.8%
	Stormwater planters	3,500	0.08	0.091	15	6,695	0.25	300	375	SF	$112,500	13.6%
	Total Site Info	**12,700**	**0.29**	**0.331**	**55**	**24,281**	**0.91**	**7,700**			**$297,500**	49.4%
8	**West New York Parking Authority: 58th Street Parking Lot**											
	Pervious pavement	24,000	0.55	0.625	105	45,886	1.72	4,200	25	SF	$105,000	85.4%
	Total Site Info	**24,000**	**0.55**	**0.625**	**105**	**45,886**	**1.72**	**4,200**			**$105,000**	85.4%
9	**West New York Parking Authority: 59th Street Parking Lot**											
	Pervious pavement	27,800	0.64	0.724	121	53,157	2.00	11,700	25	SF	$292,500	52.2%
	Total Site Info	**27,800**	**0.64**	**0.724**	**121**	**53,157**	**2.00**	**11,700**			**$292,500**	52.2%
10	**West New York Parking Authority: 62nd Street Parking Lot**											
	Pervious pavement	28,000	0.64	0.730	122	53,538	2.01	4,200	25	SF	$105,000	52.0%
	Total Site Info	**28,000**	**0.64**	**0.730**	**122**	**53,538**	**2.01**	**4,200**			**$105,000**	52.0%
11	**West New York Parking Authority: 63rd Street Parking Lot**											
	Pervious pavement	6,800	0.16	0.177	30	13,001	0.49	4,900	25	SF	$122,500	50.4%
	Total Site Info	**6,800**	**0.16**	**0.177**	**30**	**13,001**	**0.49**	**4,900**			**$122,500**	50.4%
12	**West New York Parking Authority: 66th Street Parking Lot**											
	Pervious pavement	11,300	0.26	0.294	49	21,604	0.81	2,600	25	SF	$65,000	43.7%
	Stormwater planter	14,200	0.33	0.370	62	27,147	1.02	1,400	375	SF	$525,000	54.9%
	Total Site Info	**25,500**	**0.59**	**0.664**	**111**	**48,751**	**1.83**	**4,000**			**$590,000**	98.6%
13	**West New York Parking Authority: 67th Street Parking Lot**											
	Pervious pavement	8,100	0.19	0.211	35	15,485	0.58	1,300	25	SF	$32,500	87.8%
	Total Site Info	**8,100**	**0.19**	**0.211**	**35**	**15,485**	**0.58**	**1,300**			**$32,500**	87.8%